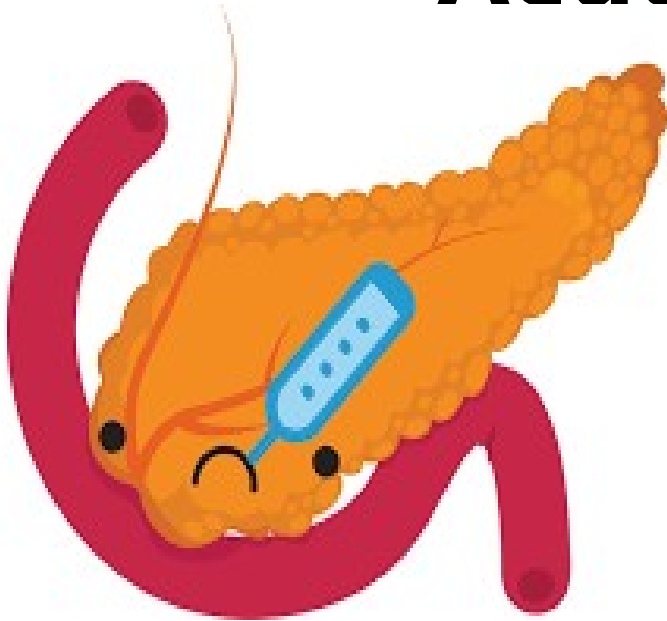
Armed Forces College of Medicine
AFCM

Acute and Chronic Pancreatitis

Dr. Riham Abu-Zeid
Prof. of Pathology

INTENDED LEARNING OBJECTIVES (ILO)

By the end of this lecture you will be able to:

- Explain pathology and complications of acute and chronic pancreatitis
- Correlate pathologic features of pancreatitis (acute & chronic) with clinical picture ,investigations and complications

Lecture Plan

1. Part 1 (5min): Define Pancreatitis
2. Part 2 (20 min) : Acute Pancreatitis
3. Part 2 (15 min): Chronic Pancreatitis
4. Lecture Quiz (5 min)

Acute Pancreatitis

Acute Pancreatitis

Def:

- Acute reversible inflammation of pancreas due to_
- **autodigestion** caused by inappropriately activated pancreatic enzymes

C/P:

- Severe upper abd… -radiate to back
- Medical emergency

Activated trypsin

Activate itself + Other proenzymes

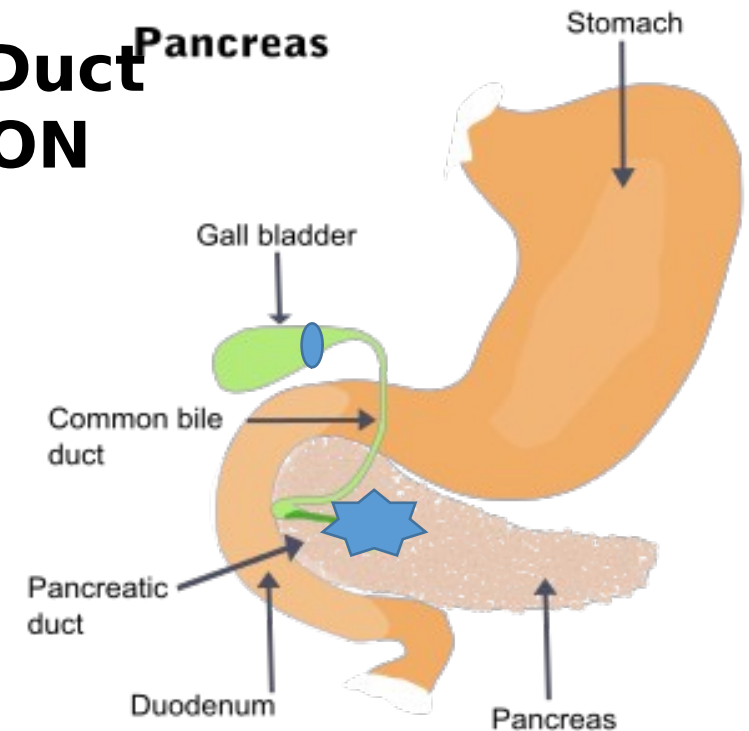
Activates kinin >VD?

Activation of factor XII >>DIC

Acute Pancreatitis

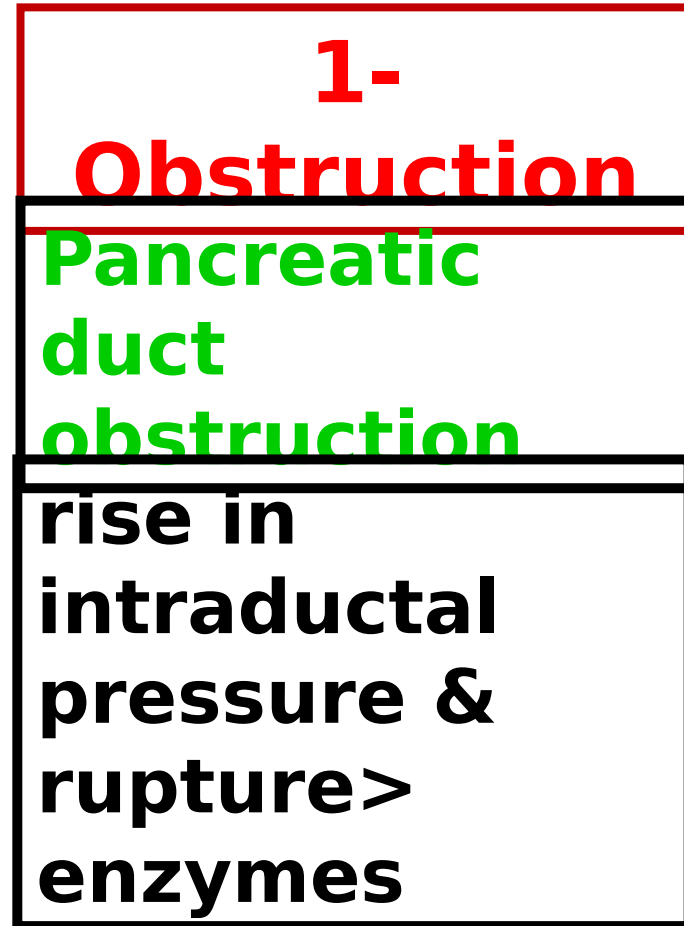
Etiologic Factors:

- **Gall bladder stones &**
- **Alcoholism are most common**
- **Others**
  - **periampullary neoplasms (obstruction)**
  - **Drugs**
  - **Trauma or iatrogenic**
  - **Vascular eg shock**
  - **Infections eg mumps**
  - **Genetic mutations**

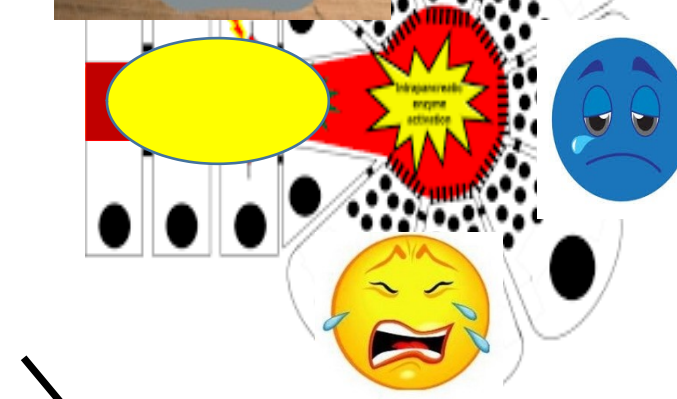
Pancreatic Duct OBSTRUCTION

Pathogenesis:

1- Obstruction

Pancreatic duct obstruction

rise in intraductal pressure & rupture> enzymes

2-Primary Acinar ll injury

Ischemia
trauma
Viruses
Drugs

Premature activation of enzymes

ACINAR CELL INJURY

Acute Pancreatitis

Trypsin & chymotrypsin proteolysis

Local :TISSUE NECROSIS

Systemic :VD & T

Lipase & phospholipase

FAT NECROSIS >

fatty acids+ CALCIUM >>

TION)

Elastases

(blood vessels): HAEMORRHAGE

EDEMA

INFLAMMATION

Amylase & lipase: rise in serum & urine

Acute Pancreatitis

Pathogenesis Summary:

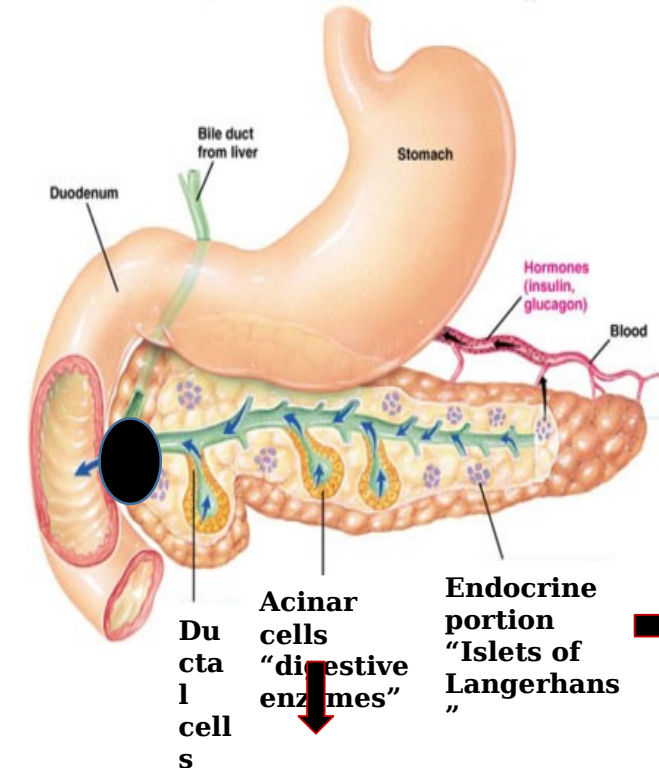
1-Pancreatic duct obstruction

- **Rise in intraductal pressure & rupture of ducts release enzymes**
- **leads to ACINAR CELL INJURY**

2-Primary Acinar cell injury

- **Ischemia -trauma –Viruses-Drugs**
- Premature activation of enzymes
- **Leads to ACINAR CELL INJURY**

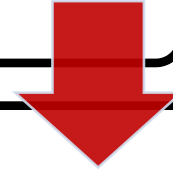
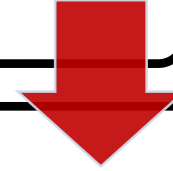
Activation of other enzymes

Acute Pancreatitis

Pathogenesis Summary

- **Trypsin & chymotrypsin > proteolysis**
  - **Local :TISSUE NECROSIS**
  - **Systemic :VD & Thrombi**
- **Lipase & phospholipase**
  - **FAT NECROSIS liberates fatty acids which binds with CALCIUM >> CALCIFICATION)**
- **Elastases (blood vessels):**
  - **HAEMORRHAGE**
  - **EDEMA**
  - **INFLAMMATION**
- **Amylase & lipase: rise in serum & urine**

Acute Pancreatitis

Severity

Acute pancreatitis

Acute necrotizing pancreatitis

Acute hemorrhagic pancreatitis

Acute Pancreatitis

Gross:

- **Pancreas is enlarged swollen & oedematous**
- **Yellowish white areas of Necrosis**
- **Chalky white foci of Calcification**
- **ge**

Fat and Parenchymal Necrosis with Saponification

Parenchymal Edema

@PancPathologist

https://pbs.twimg.com/media/CpVlS1DXEAA3KdX.jpg

chalky white areas of calcification

https://prod-images-static.radiopaedia.org/images/5900021/0c97f893a51c82691beae25da2f3c2_jumbo.jpg

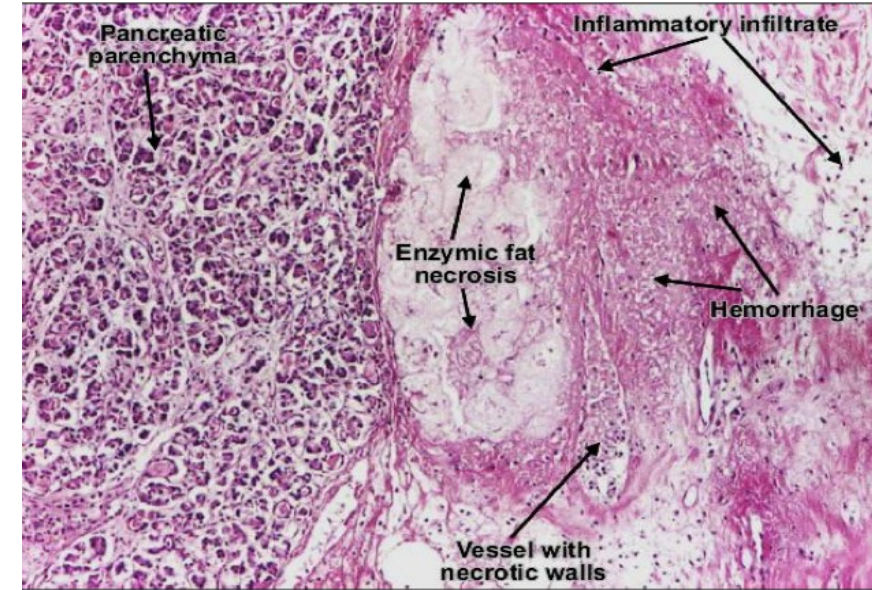
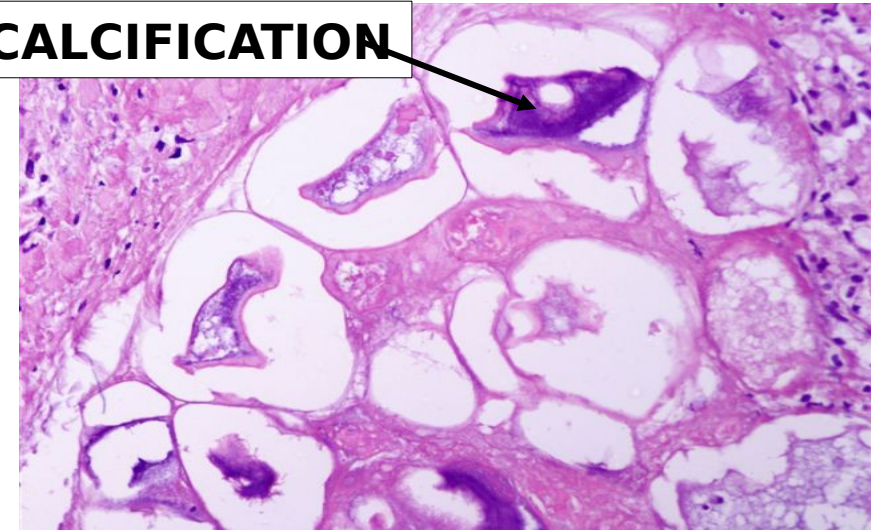
Acute Pancreatitis

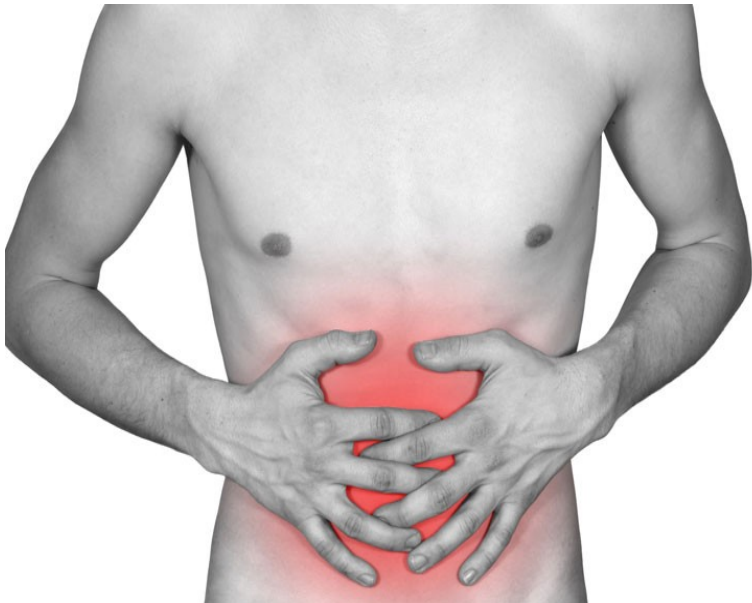
Mic:

- FAT NECROSIS
- Foci of CALCIFICATION (blue foci)
- Acute INFLAMMATORY cellular infiltrate
- Areas of HAEMORRHAGE & necrosis

https://d1yboe6750e2cu.cloudfront.net/i/93a180200659fe1f2fb1365d30b5469d0

CALCIFICATION

http://www.pathologyoutlines.com/images/

Acute Pancreatitis

Diagnosis:

Abdominal pain radiating to back

https://www.[illegible]r.co[illegible].au/wp-content/uploads/2019/04/pancreatitis_pain_750-2.jpg

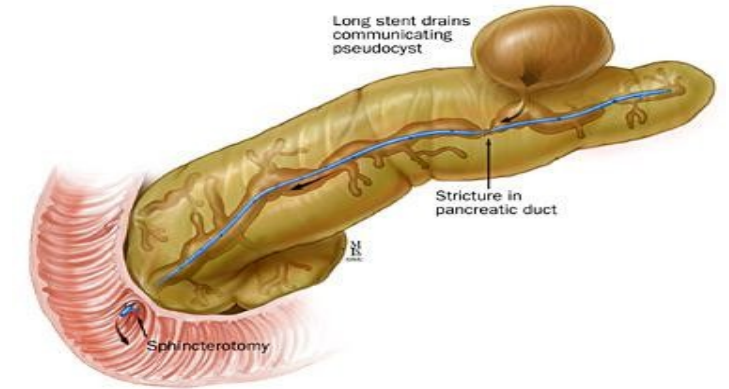
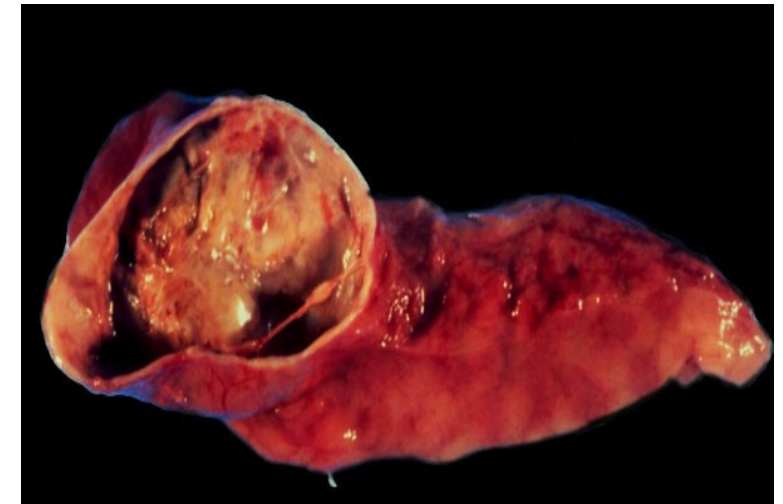
- **High Serum amylase**
- **High serum lipase**
- **Hypocalcemia**
- **CT & MRI enlarged inflamed pancreas +/- calcifications**

https://www.nejm.org/na101/home/literatum/publisher/mms/journals/content/nejm/2017/nejm_2017.376.issue-5/nejmicm1602248/20180122/images/img_large/nejmicm1602248_f1.jpeg

Complications

1-Local :

- **Pseudocyst :**
  - Necrotic material walled of by Fibrous tissue
  - no lining – filled with serous fluid
- **Abscess**

http://www.digestive-surgery.gr/images3/large/pseudocyst02.jpg

https://www.uaz.edu.mx/histo/pathology/ed/ch_15/c15_s7.jpg

Acute Pancreatitis

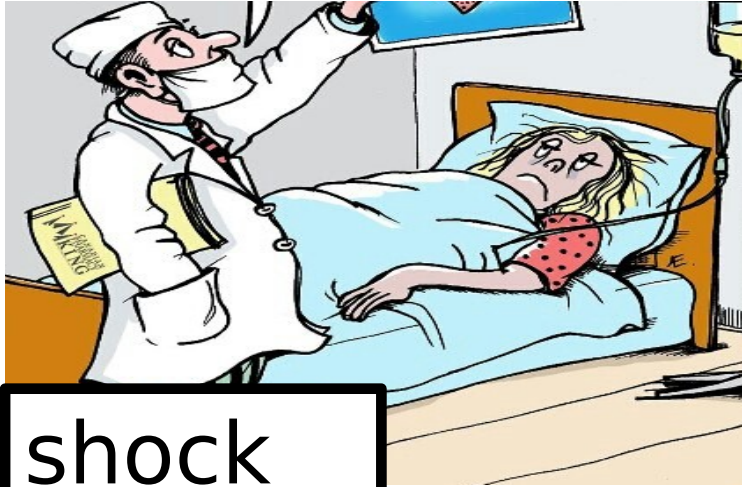
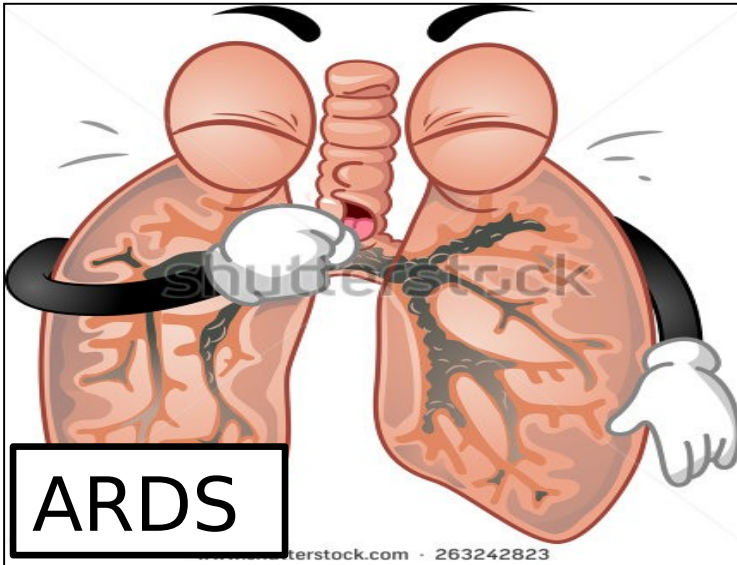
2.Systemic complications

shock

ARDS

DIC

Renal failure
ATN

Acute Pancreatitis

Complications (Cont)

2-Systemic:

systemic release of digestive enzymes & explosive activation of inflammatory (response may be FATAL)

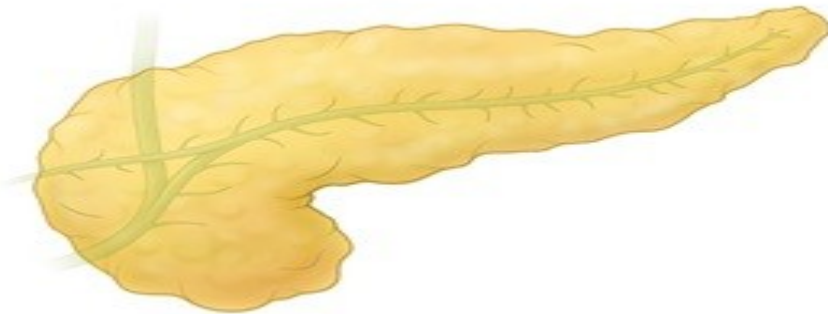
- **Shock** due to activation of **kinin** system (by trypsin)> marked vasodilatation & increased vascular permeability
- **DIC** (Activation of factor **XII>>DIC(disseminated intravascular coagulopathy)**
- **Acute respiratory distress syndrome** (due to alveolar capillary injury)

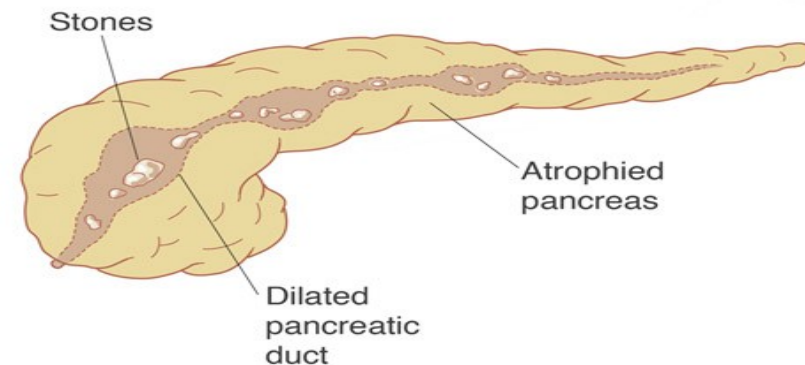
Acute pancreatitis (Quiz)

Match

	Answer	
1. Trypsin & chymotrypsin locally	e	a. Hemorrhage
2. Lipase & phospholipases	d.	b. Shock
3. Elastase	a	c. DIC
4. Activation of kinin system by trypsin	b	d. Calcification
5. Activation of Factor XII by trypsin	c	e. Tissue necrosis

repeated bout of inflammation

Leading to Irreversible fibrosis & destruction of

http://digestivesystum.weebly.com/uploads/5/2/6/8/52680467/939825_orig.jpg

https://www.thegastrosurgeon.com/images/chronic-pancreatitis-diagram-pancreas.jpg

Chronic Pancreatitis

Clinical Picture & Complications

- Silent
- Repeated attacks of abdominal pain
- Indigestion & steatorrhea & Wt loss
- **Diabetes mellitus**

  (loss of islets of Langerhan's)
- **Malignancy**

Investigations:

- **Pancreatic calcification in CT**
- **Blood sugar ? High**

Abdominal pain +/- Jaundice

Weight loss

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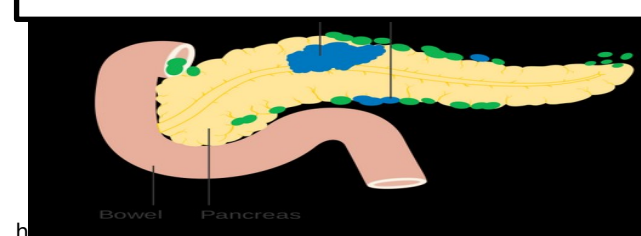

https://cdn.clipart.email/a1acb6bb24727f7e609b4ff08565bb33_lifetime-learning-diabetes-self-management-

Cancer

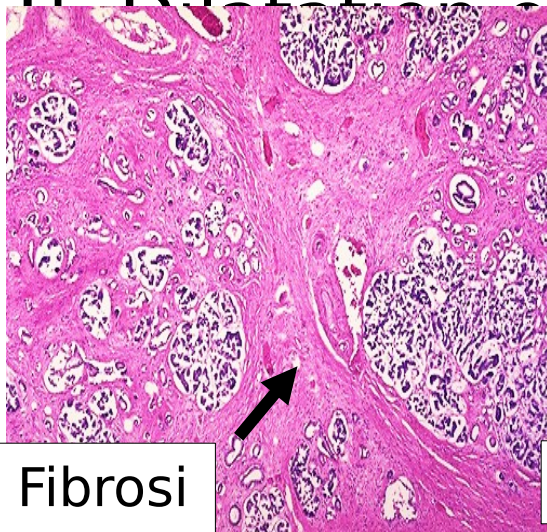
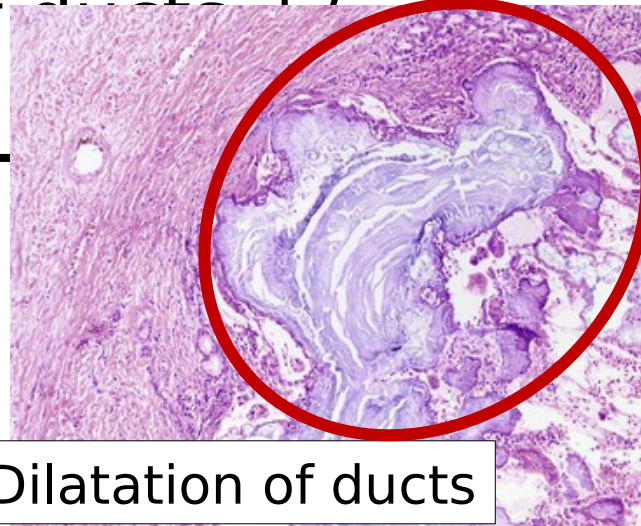
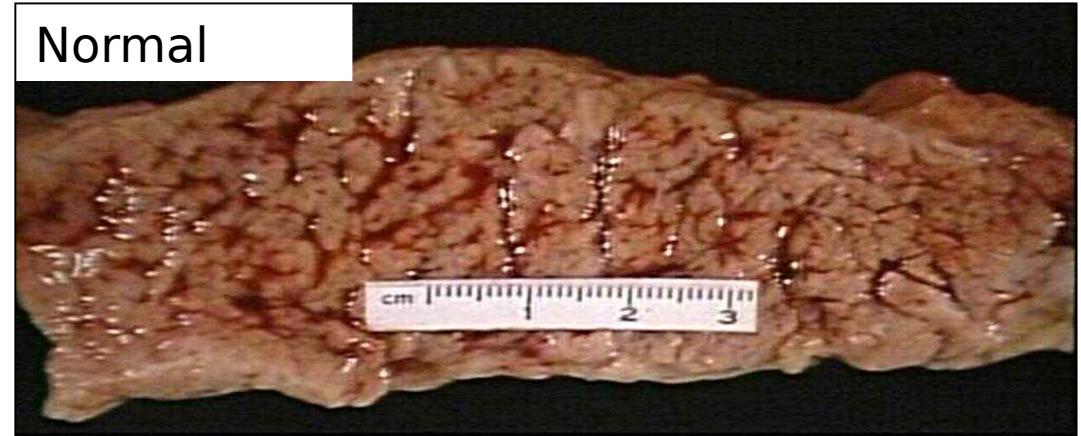
h... a/a6/ Diagram_showing_stage_T3_cancer_of_the_pancreas_CRUK_261.svg/316px-Diagram_showing_stage_T3_cancer_of_the_pancreas_CRU

Chronic Pancreatitis

Gross:

1. Shrunken -Distorted
2. Hard mistaken for malignancy

Mic:

3. Fibrosis
4. Inflammation
5. Dilatation of ducts +/

https://www.uaz.edu.mx/histo/Webpatutah/JPEG4/GI092.JPG

https://clinicalgate.com/wp-content/uploads/2015/03/c00039_f039-005-97814557074781.jpg

http://www.stritch.luc.edu/lumen/MedEd/Radio/curriculum/Mechanisms/MHD/Chronic_pancreatitis.jpg

Pancreatitis (Quiz)

Which of the following is expected to be present with acute pancreatitis ?

a. Low serum amylase
b. Low serum calcium
c. Low serum lipase
d. Leucopenia

Complete :

Microscopic picture of chronic pancreatitis includes……………………………………………………………

Which of the following is expected to be present with acute pancreatitis ?

a. Low serum amylase
b. Low serum calcium
c. Low serum lipase
d. Leucopenia

Complete :

Microscopic picture of chronic pancreatitis includes

Fibrosis -Inflammation -Dilatation of ducts +/- calcification

Keypoints

- Acute pancreatitis :causes- local and systemic effects
- Local effects of acute pancreatitis : Tissue necrosis –Fat necrosis hemorrhage –dystrophic calcification
- Systemic effects : Increased serum amylase and lipase –low calcium

  Shock –DIC= Acute renal failure ARDS

- Pathogenesis and mechanism of local and systemic effects of acute pancreatitis

Suggested Textbook

Neil D. Theise. Liver and gall bladder. In Robbins and Cotran pathologic basis of disease, 10th edition. Kumar, Abbas & Aster (eds). Elsevier Saunders. Pages 680-690

Time to rest Thank You